

ELECTRICITY TRANSACTIONS ACROSS INTERNATIONAL BORDERS-1998

This brief report contains information on the level of electricity trade that occurred between the United States, Canada and Mexico during Calendar Year 1998 by both quantity and US dollar value of electricity traded. The information used was reported to the Department of Energy (DOE) by the holders of Presidential permits and electricity export authorizations.¹ The energy values reported represent scheduled transactions. This often differs from the other method of recording electric energy transactions, metered flows. We prefer to consider scheduled transactions because we believe that it provides a more meaningful measure of the level of intended trade and avoids the sometimes confusing issue of inadvertent power flows.

Figure 1 displays the aggregate volumes of imports and exports during 1994-1998. Table 1 contains summaries of U.S. electricity imports and exports and the respective costs and revenues associated with those quantities of electricity during 1998.

In 1998, the U.S. imported 45.4 Million MWh (millions of megawatt hours, 1 MWh = 1000 kilowatt hours) of electric energy at a cost of \$913.5 million. Of this total, 45.4 Million MWh (almost 100%) were imported from Canada and the remainder, 11.2 MWh (.025%), were received from Mexico. During this same period, U.S. exports of electric energy totaled 17.9 Million MWh with gross revenues of \$271.5 million. Of this, 15.9 Million MWh (89%) representing \$210 million in revenue were delivered to Canada, and 1.9 Million MWh (11%) representing \$61.4 million in revenue were delivered to Mexico. On a net basis, the U.S. imported 27.5 Million MWh of electric energy.

Table 2 details the 1998 electricity transactions by NERC² region and by company. It should be noted that a significant number of exports to Canada were not "sales" but rather exchanges under swap arrangements for which no money changed hands. The footnotes to Table 2 provide further details regarding the amounts of exchange imports and exports by company.

¹ Executive Order 12038 requires the issuance of a Presidential permit by DOE before an electric transmission line may be constructed across the U.S. international border. Exports of electric energy from the U.S. to a foreign country are also regulated and require authorization under section 202(e) of the Federal Power Act.

² In 1968, electric utilities formed the North American Electric Reliability Council (NERC) in order to promote the reliability of the electric supply for North America. Five of NERC's ten Regional Councils border and are interconnected with either Canada or Mexico.

Figure 1
U.S. Electricity Imports and Exports, 1994-1998

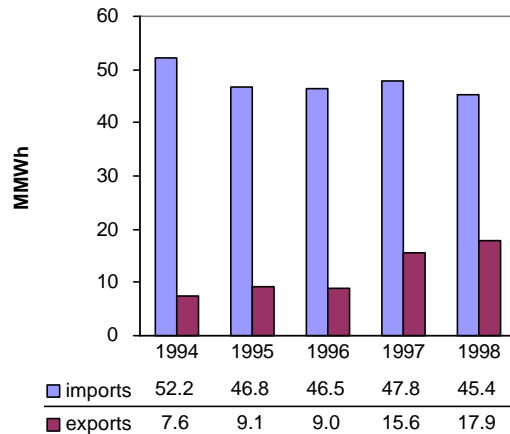


Table 1
Summary of International Electricity Transactions for 1998

1/ Region	Imports from Canada		Exports to Canada		2/ Net Canadian	
	(MWh)	Cost (US \$)	(MWh)	Revenue (US\$)	Transactions (MWh)	Cost (US\$)
NPCC - New England	15,421,086	362,051,069	185,595	12,348,465	15,235,491	349,702,604
NPCC - New York	4,129,659	59,739,928	3,404,650	62,235,216	725,009	(2,495,288)
ECAR	2,025,442	67,066,877	3,559,357	42,859,657	(1,533,915)	24,207,220
MAPP	12,588,216	209,899,382	1,525,491	21,742,798	11,062,725	188,156,584
WSCC - Canada	11,243,698	214,593,091	7,271,331	70,945,445	3,972,367	143,647,646
Subtotal Canada	45,408,101	913,350,347	15,946,424	210,131,581	29,461,677	703,218,766
1/ Region	Imports from Mexico		Exports to Mexico		2/ Net Mexican	
	(MWh)	Cost (US \$)	(MWh)	Revenue (US\$)	Transactions (MWh)	Cost (US\$)
ERCOT	364	8,552	4,625	274,176	(4,261)	(265,624)
WSCC - Mexico	10,885	111,450	1,968,578	61,127,306	(1,957,693)	(61,015,856)
Subtotal Mexico	11,249	120,002	1,973,203	61,401,482	(1,961,954)	(61,281,480)
Grand Total US	45,419,350	913,470,349	17,919,627	271,533,063	27,499,723	641,937,286

1/ Regions are five of the nine reliability councils of the North American Electric Reliability Council that border either Canada or Mexico.

2/ Positive values indicate that the US utilities are net importers of electric energy and the dollar figure associated with these transactions are costs to the utilities. Negative values appear in parentheses and indicate that the US region is a net importer of electricity and the dollar figure associated with these transactions are paid to utilities.

TABLE 2

1998 REGIONAL ELECTRICITY TRANSACTIONS ACROSS INTERNATIONAL BORDERS

United States Utility/Firm	Canadian Utility/Firm	Interconnection Point	Electricity Imports (MWH)	Cost(\$)	Electricity Exports (MWH)	Revenues(\$)
NORTHEAST POWER COORDINATING COUNCIL (NPCC) - NEW ENGLAND STATES SYSTEMS						
Central Maine Power Company	Hydro Quebec	Colburn Gore, Maine	292	20,909	0	0
Citizens Utilities Company	Canadian Custom House; Hydro Quebec	Lake Memphremagog, Vermont; Derby Lin Vermont	389,702	1/ 20,253,001	0	0
Eastern Maine Electric Cooperative	New Brunswick El. Power Commission; Fraser Cos, Ltd.	Calais, Maine; Forest City, Maine	111,777	5,277,495	0	0
Vermont Electric Transmission Company, Inc.	Hydro Quebec	Norton, Vermont	9,051,031	235,205,330	156,332	9,951,262
Joint Owners of the Highgate Project	Hydro Quebec	Highgate, Vermont	1,354,702	78,052,368	11,331	947,946
Maine Electric Power Company	New Brunswick El. Power Commission	Houlton, Maine	3,851,739	2,483,534	1,950	30,309
Maine Public Service Co.	New Brunswick El. Power Commission	Fort Fairfield, Maine; Easton Township, Aroostock County, Maine; Madawaska, Maine	334,300	6,277,946	15,982	390,047
Vermont Electric Cooperative	Hydro Quebec	Derby Line, Vermont	11,523	357,035	0	1,028,901
Fraser Companies, Ltd.	Fraser Companies, Ltd.	Matawaska, Maine	316,020	14,123,451	0	0
TOTAL NPCC (NEW ENGLAND)			15,421,086	362,051,069	185,595	12,348,465

United States Utility/Firm	Canadian Utility/Firm	Interconnection Point	Electricity Imports (MWH)	Cost(\$)	Electricity Exports (MWH)	Revenues(\$)
NORTHEAST POWER COORDINATING COUNCIL (NPCC) - NEW YORK SYSTEMS						
New York Power Authority	Ontario Hydro; Hydro Quebec	Niagara, New York; Massena, New York; Fort Covington, New York	6/ 3,712,111	54,857,406	7/ 1,626,918	25,660,635
Niagara Mohawk Power Corporation	Canadian Niagara Power Co; Hydro Quebec	Hogansburg-St. Regis, New York; York; Devil's Hole, New York; Buffalo- Ft. Erie, New York; Rainbow Bridge, New York	8/ 417,548	9/ 4,882,522	172,009	3,320,433
10/ Power Marketers			0	0	1,605,723	33,254,148
TOTAL NPCC (NEW YORK)			4,129,659	59,739,928	3,404,650	62,235,216
United States Utility/Firm	Canadian Utility/Firm	Interconnection Point	Electricity Imports (MWH)	Cost(\$)	Electricity Exports (MWH)	Revenues(\$)
EAST CENTRAL AREA RELIABILITY COORDINATION AGREEMENT (ECAR)						
Detroit Edison Company	Ontario Hydro	Waterman, Maryville St. Clair, Michigan	11/ 2,025,442	12/ 67,066,877	3,559,357	42,859,657
St. Clair Tunnel Company	Ontario Hydro	Port Huron, Michigan	0	0	0	0
TOTAL ECAR			2,025,442	67,066,877	3,559,357	42,859,657

United States Utility/Firm	Canadian Utility/Firm	Interconnection Point	Electricity Imports (MWH)	Cost(\$)	Electricity Exports (MWH)	Revenues(\$)
MID-CONTINENT AREA POWER POOL (MAPP)						
Basin Electric Cooperative	Saskatchewan Power Cooperative	Tioga, ND (Boundary Dam)	143,763	^{13/} 1,573,346	^{14/} 500,115	7,503,247
Boise Cascade Corporation	Boise Cascade Canada, Ltd.	International Falls, Minnesota	0	0	0	0
Minnesota Power and Light Co.	Manitoba Hydro Elec. Board; Ontario Hydro	Warroad, Roseau County, MN	1,759,348	28,930,963	199,446	3,201,357
Minnkota Power Cooperative	Manitoba Hydro Elec. Board	Pembina, ND; Warroad, Roseau Co, MN; Norwest Angle State Forest Reserve, MN	944,882	19,318,011	0	0
North Central Electric Cooperative, Inc.	Manitoba Dep't of Mines, Natural Res. and Environment	International Peace Garden	0	0	17	1,072
Northern Electric Cooperative, Inc.	Northern Electric Cooperative, Inc. Customers	Opheim, Montana	0	0	88	5,709
Northern States Power Company	Manitoba Hydro Electric Board	Pembina, ND; Warroad, Roseau County, MN	9,740,218	^{15/} 160,076,627	824,942	10,973,581
Roseau Electric Cooperative	Manitoba Hydro Electric Board	Roseau County, MN; Lake of the Woods County, MN	5	435	883	57,832
TOTAL MAPP			12,588,216	209,899,382	1,525,491	21,742,798

United States Utility/Firm	Canadian Utility/Firm	Interconnection Point	Electricity Imports (MWH)	Cost(\$)	Electricity Exports (MWH)	Revenues(\$)
WESTERN SYSTEMS COORDINATING COUNCIL (WSCC)						
Bonneville Power Administration	BC Hydro; W. Kootenay Power & Light Co., Ltd	Blaine, Washington	11,224,412	214,053,072	17/ 4,553,921	18/ 36,946,534
Glacier Electric Cooperative, Inc.	Glacier Electric Cooperative Customer:	Del Bonita, Montana; Carway, Montana	0	0	239	12,904
Hill County Electric Cooperative, Inc.		Wildhorse, Montana	0	0	9,150	247,076
Marias River Electric Cooperative, Inc.	Southern Utilities, Ltd.	Sweetgrass, Montana	0	0	2,910	117,464
P.U.D. No. 1 of Pend Oreille County, WA	West Kootenay Power & Light Company, Ltd.	Nelway, Washington	0	0	19/ 348	8,636
Puget Sound Power and Light Company	BC Hydro	Point Roberts, Washington	19,286	540,019	0	0
10/ Power Marketers			0	0	2,704,763	33,612,831
TOTAL WSCC w/CANADA			11,243,698	214,593,091	7,271,331	70,945,445

United States Utility/Firm	Canadian Utility/Firm	Interconnection Point	Electricity Imports (MWH)	Cost(\$)	Electricity Exports (MWH)	Revenues(\$)
ALASKA						
Westmin Resources Limited	BC Hydro	No connection with U.S. firm. Line goes through Alaska.				
TOTAL ALASKA						
TOTAL TRANSACTIONS w/CANADA			45,408,101	913,350,347	15,946,424	210,131,581
United States Utility/Firm	Mexican Utility/Firm	Interconnection Point	Electricity Imports (MWH)	Cost(\$)	Electricity Exports (MWH)	Revenues(\$)
ELECTRIC RELIABILITY COUNCIL OF TEXAS (ERCOT)						
Central Power and Light Company	Comision Federal de Electricidad	Amistad Dam, Del Rio, TX; Eagle Pass, TX; Laredo, TX	363	8,552	2,025	53,456
Rio Grande Electric Cooperative, Inc.	Comision Federal de Electricidad	Heath Crossing, TX; Lajitas, TX; Castolon, TX; Candelaria, TX; Constock, TX	0	0	1,823	187,156
West Texas Utilities Company	Comision Federal de Electricidad	Redford, TX Presidio, TX	20/ 1	0	21/ 777	33,564
TOTAL ERCOT			364	8,552	4,625	274,176

United States Utility/Firm	Mexican Utility/Firm	Interconnection Point	Electricity Imports (MWH)	Cost(\$)	Electricity Exports (MWH)	Revenues(\$)
WESTERN SYSTEMS COORDINATING COUNCIL (WSCC)						
Arizona Public Service Co.	Comision Federal de Electricidad	San Luis, Douglas, AZ; El Centro, CA	0	0	0	0
Citizens Utilities Company	Comision Federal de Electricidad	Nogales, Arizona; Lochiel, Arizona	0	0	1,620	122,579
El Paso Electric Company	Comision Federal de Electricidad	El Paso, Texas	0	0	1,022,047	35,796,098
Trico Electric Cooperative	Comision Federal de Electricidad	Sasabe, Arizona	0	0	1,569	151,599
San Diego Gas and Electric	Comision Federal de Electricidad	Community of San Ysidro, City of San Diego, California	10,885	111,450	16,336	622,456
Southern Cal. Edison Co.	Comision Federal de Electricidad	Tijuana-Miguel Interconnection; La Rosita-Imp. Valley Interconnection;	0	0	0	0
Imperial Irrigation District	Comision Federal de Electricidad	Calexico, California	0	0	450	17,400
10/ Power Marketers			0	0	926,556	24,417,174
	TOTAL WSCC w/MEXICO		10,885	111,450	1,968,578	61,127,306
	TOTAL TRANSACTIONS w/MEXICO		11,249	120,002	1,973,203	61,401,482
GRAND TOTAL U.S. INTERNATIONAL TRANSACTIONS			45,419,350	913,470,349	17,919,627	271,533,063

FOOTNOTES

- 1/ During the months of January, February, and March 1998, Citizens Utility Company transported 64,507 MWh of Hydro Quebec power across its transmission system under its Open Access Transmission Tariff. These deliveries were made to alleviate transmission outages in the province of Quebec resulting from the severe ice storm. The energy and demands amounts reported under Presidential Permit No. 66 include imports for Hydro Quebec. No costs are reported associated with these ice storm deliveries since Hydro Quebec was both the supplier and recipient of this power.
- 2/ On January 23, 1998 a Temporary Emergency Order was issued in FE docket EA-173 authorizing NEPOOL to make emergency emergency exports to Quebec, Canada. NEPOOL is authorized to use PP-76 which is permitted to the Vermont Electric Transmission Company. The export amount includes 10,931 MWh and \$890,943 in revenue received for this emergency export.
- 3/ The energy was received and transmitted over the facilities of the Maine Electric Power Company.
- 4/ The power transmitted from MEPCO to Canada represents the Maine Public Service and Eastern Maine Electric Cooperative's shares of the Maine Yankee and W.F. Wyman No. 4 power plants that are delivered to U.S. utilities via the New Brunswick Electric Power Commission for only a wheeling charge.
- 5/ All revenues had no associated exports.
- 6/ Includes 185,070 MWh of exchange imports.
- 7/ Includes 218,850 MWh of exchange imports.
- 8/ Includes 198,206 MWh of wheeled energy.
- 9/ Includes revenue for wheeling power from Canada to various utilities.
- 10/ In 1998, 23 power marketers and other entities that are authorized to export electric energy reported export activity at the international border between the U.S. and Canada and Mexico. Eleven such entities utilized the permitted transmission facilities of the Northeast Power Coordinating Council-New York; eight the permitted facilities of the Western Systems Coordinating Council-Canada; and four utilized the Western Systems Coordinating Council-Mexico. Six entities did not report any revenues associated with their exports.
- 11/ Include 1,419,813 MWh of exchange imports.
- 12/ Includes 1,499,250 MWh of exchange exports.
- 13/ Includes 79,550 MWh of exchange imports.
- 14/ Includes 82,000 MWh of exchange exports.
- 15/ Includes 3,504,145 MWh of exchange exports.
- 16/ Includes 77,715 MWh of exchange exports.
- 17/ Represents consideration paid by U.S. utilities in Washington, Oregon, Idaho, California and Montana based on contractual agreements with West Kootenay Power & Light and British Columbia Hydro. These costs were not incurred by the Bonneville Power Administration.